DAP™-AM Series - Metal Powders for 3D printing -

Daido **A**lloy **P**owder – for **A**dditive **M**anufacturing

Die steel-based powder for printing large products DAP™-AMLTX

DAP™-AM LTX have been developed by adjusting chemical composition of metal powder suitable for additive manufacturing for large products exceeding 150 mm square by SLM.

Characteristics

·Powders produced by gas atomization and have low oxygen content and high flowability.

·Reduces internal strain during molding compared to H13 and DAP™-AM HTC, suitable for large-sized products.

·Thermal conductivity is equivalent to SKD61. Mold performance is expected to be similar.

·Cois not contained.

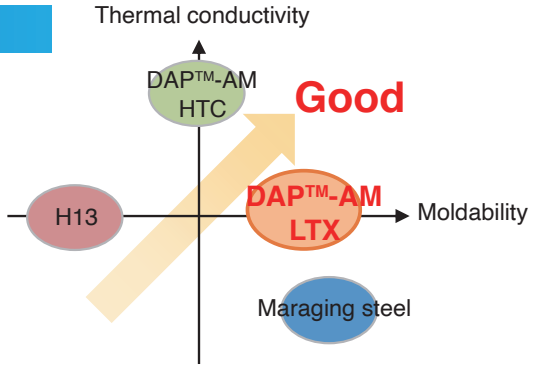


Fig.1 Characteristics of DAP™-AM LTX compared to other powders.

Major applications

Pins and inserts etc. with cooling holes

Typical chemical composition and hardness range

Typical chemical composition(mass%)						Hardness range (HRC)
C	Si	Ni	Cr	Mo	V	
0.25	0.1	6	5.2	1.2	0.4	40~54

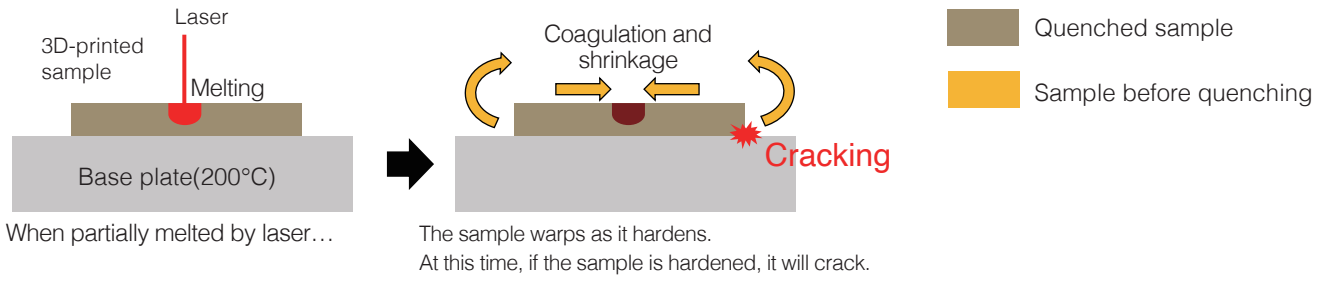
Particle size

Particle size(μm)
-53/+25

Why does internal strain remain low?

By designing alloys with a martensitic transformation starting temperature (the temperature at which they become hardened by quenching) lower than the molding temperature, the material is not quenched during the molding process, and is soft and less prone to distortion accumulation.
After the molding process is completed, the entire molding part is simultaneously quenched and hardened.

SKD61, DAP™-AM HTC : Hardening starts between 300°C to 400°C after quenching.



DAP™-AM LTX : Hardening starts at 200°C after quenching

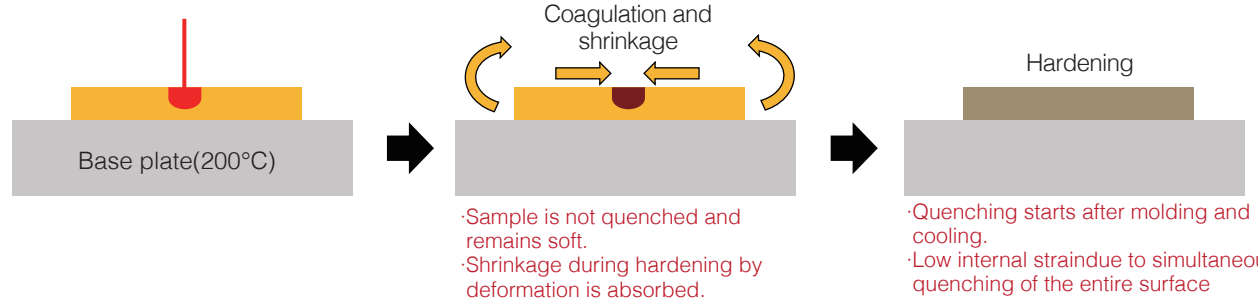
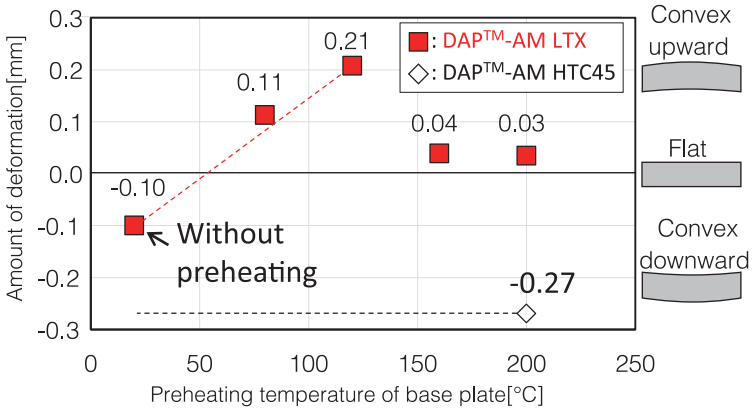


Fig.2 Strain improvement mechanism of DAP™-AM LTX.

Influence of base plate temperature on internal strain

Stable low strain can be obtained by heating the base plate to 160°C or higher.
If heating to 160°C or higher is impossible, adjust the temperature around 50°C to reduce strain.



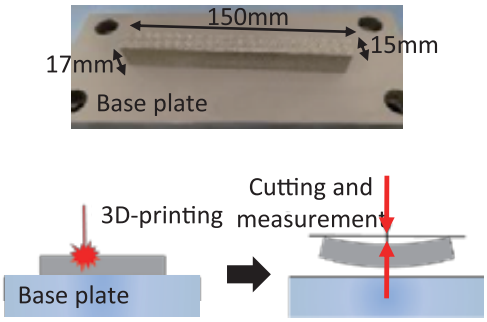


Fig.3 Relationship between preheating temperature of base plate and amount of 3D-printed sample.

Properties

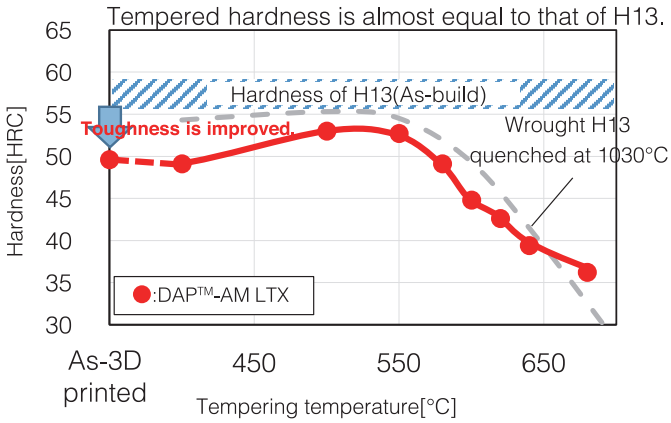


Fig.4 Tempering Hardness of DAP™-AM LTX compared to H13.
(Tempering [T°C × 1h] 2 times, base plate temperature 120°C)

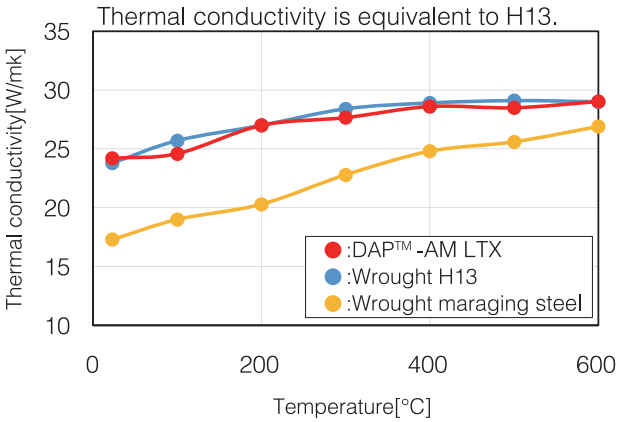


Fig.5 Thermal conductivity of DAP™-AM LTX compared to H13 and maraging steel.

3D-printing

↓

Hardening (Release strain)

Quenching is not required.
Tempering is recommended at least twice.

↓

Removing from base plate

Baseplate temperature is 160°Cor higher is recommended.

↓

Machining

Final tempering should be performed at 550°Cor higher.

Fig.6 Mold manufacturing process of DAP™-AM LTX

Large products exceeding 150 mm square can be modeled.

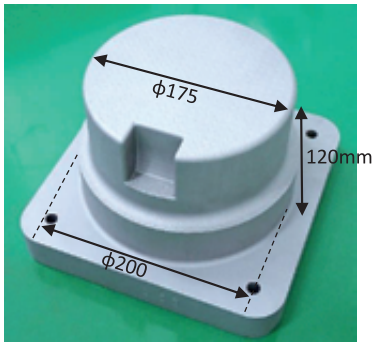


Fig.7 The example of 3D-printed sample of DAP™-AM LTX.

DAIDO STEEL CO., LTD.

Tokyo Head Office (Metal Powder Marketing & Sales Sect. Metal Powder Dept.) Daido Shinagawa Building, 6-35, Konan 1-chome, Minato-ku, Tokyo, 108-8478 TEL +81-3-5495-1284

Nagoya Office 10, Ryugu-cho, Minato-ku, Nagoya, Aichi, 455-0022 TEL +81-52-694-0776

Web site: https://www.daido.co.jp/en/products/powder/dap_am2/index.html
Email address: funmatsu@ask.daido.co.jp

WC2202 22.0,3(DDD)